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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicants:	Takatoshi Tsujimura	§	Art Unit:	1762
Serial No.:	10/693,244	§	Examiner:	David P. Turocy
Filed:	October 24, 2003	§	Docket No.	CMO.0012US (92096US)
Title:	FORMING A THIN FILM STRUCTURE	§		

Commissioner for Patents  
Washington, D.C. 20231

### DECLARATION OF CHENG-CHI WANG UNDER 37 C.F.R. 1.132

Dear Sir:

I, Cheng-Chi Wang, state as follows:

1. I am an engineer employed at Chi Mei Optoelectronics, a manufacturer of liquid crystal display (LCD) devices.
2. My title is Principle Engineer. I have been employed at Chi Mei for 8 years. My primary job responsibilities include research and development in new materials, thin film process, and photolithography.
3. I received a Master's degree in Physics from National Taiwan University located in Taipei, Taiwan, in 1993.
4. As a result of my education background and work experience at Chi Mei, I am very familiar with the manufacturing process of thin film structures.
5. I have reviewed both U.S. Patent No. 5,686,349 (Nakata '349) and 6,271,062 (Nakata '062).
6. As shown in Fig. 1 of Nakata '349, an exhaust path 5 (not specifically described in Nakata '349) is depicted. Nakata '349 explains that valve 3 is open and valve 4 is closed (Fig. 1) to allow both a material gas and hydrogen gas to be introduced into the chamber 30. Nakata '349, 5:37-40. In the next phase (hydrogen plasma treatment phase), valve 4 is open and valve 3 is close to allow only hydrogen gas (and not the material gas) to be introduced into the chamber 30. Nakata '349, 5:40-43. When the valve 4 is open, the material gas is "directly exhausted by an exhausting pump (not shown)." Nakata '349, 5:40-42. Although stated as not shown in Nakata '349, Nakata '062 explicitly shows an exhausting pump 45 connected to the exhaust path (equivalent to exhaust path 5 in Nakata '349) of the

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chamber 51 of Nakata '062. In fact, valve 44 in Nakata '062 (which is the equivalent of valve 4 in Nakata '349) is shown in Fig. 2 of Nakata '062 as being coupled to the exhausting pump 45. See Nakata '062, 9:41-43 ("In contrast, when the valve 43 is closed and the valve 44 is opened, the material gas is exhausted directly by the exhausting pump 45 without being introduced into the reaction chamber 51."). As specifically taught by both Nakata '349 and Nakata '062, during the phase in which only hydrogen is delivered to the reaction chamber, the material gas through valve 4 is exhausted through an exhausting pump (45 in Nakata '062). Since the exhausting pump is coupled to the exhaust path 5 of Nakata '349, this necessarily means that any residual SiH<sub>4</sub> in the chamber would have been exhausted out of the chamber 30 by the exhausting pump when introduction of the material gas is stopped.

7. Due to the presence of the exhausting pump in both Nakata '349 and Nakata '062 (which exhausting pump is connected to the exhaust output of the reaction chamber), a person of ordinary skill in the art would have understood that no deposition of a thin film would occur in the reaction chamber (30 in Nakata '349 and 51 in Nakata '062) during the plasma treatment phase of Nakata '349 when hydrogen only is being delivered.
8. In the Example 1 embodiment of Nakata '349, deposition of an amorphous silicon layer on the substrate occurs during the first time period in which the material gas (SiH<sub>4</sub>) and hydrogen gas are introduced. Nakata '349, 5:45-58; 6:59-7:37. As a result, even if there were any residual SiH<sub>4</sub> remaining in the chamber 30 (which is highly unlikely due to presence of the exhausting pump), the remaining SiH<sub>4</sub> would be deposited onto the amorphous silicon layer as amorphous silicon, not microcrystalline silicon.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date:

Sep. 26 '06

Cheng-Chi Wang